

Applicants: Short et al.  
Application No: 10/560,210  
Amendment and Response dated February 3, 2009  
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**AMENDMENTS TO THE CLAIMS:**

The following list of claims will replace all prior versions, and listings, of claims. Please amend the claims as follows:

1.-84. (canceled)

85. (new) A method for preparing a heterogenous binding surface on a substrate comprising:

depositing a plasma polymer on the substrate using at least one organic compound monomer as a source of plasma;

moving at least one of:

- (i) the source of plasma, and
- (ii) the substrate,

relative to one another during plasma deposition such that at least part of the substrate has a plasma polymer deposit that has non-uniform characteristics selected from the group consisting of being heterogenous chemically, heterogeneous physically, and combinations thereof; and

coating at least part of the plasma polymer deposit with a binding entity onto which a cell can attach to define a heterogeneous binding surface.

86. (new) The method of claim 85 wherein the binding entity comprises a carboxyl or an amine functional group.

87. (new) The method of claim 85 wherein the binding entity is selected from the group consisting of cells, metabolites, pharmaceutically active agents, proteins including hormones, antibodies, enzyme, receptor, macromolecules including DNA, RNA, protein fragments, peptides, polypeptides, ligands, proteoglycans, carbohydrates, nucleotides, oligonucleotides,

toxic reagents and chemical species.

88. (new) The method of claim 85 wherein the binding entity comprises a biological entity which is immobilized or adsorbed.

89. (new) The method of claim 88 wherein the biological entity is a protein or a protein fragment.

90. (new) The method of claim 85 wherein the binding entity interacts covalently with functional groups of the plasma polymer deposit.

91. (new) The method of claim 85 wherein the binding entity is immobilized on the plasma polymer deposit.

92. (new) The method of claim 85 wherein the binding entity is chemically linked to functional groups in the plasma polymer deposit.

93. (new) The method of claim 85 wherein the binding entity interacts non-covalently with functional groups of the plasma polymer deposit.

94. (new) The method of claim 85 wherein a cell interacts with the binding entity of the plasma polymer deposit.

95. (new) The method of claim 85 wherein the organic compound monomer is a volatile alcohol.

96. (new) The method of claim 85 wherein the organic compound monomer is a volatile acid.

97. (new) The method of claim 85 wherein the organic compound monomer is a volatile amine.

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98. (new) The method of claim 85 wherein the organic compound monomer is a volatile hydrocarbon.

99. (new) The method of claim 85 wherein the organic compound monomer is a volatile fluorocarbon.

100. (new) The method of claim 85 wherein the organic compound monomer is tetraethyleneglycol monoallyl ether.

101. (new) The method of claim 85 wherein the organic compound monomer is a volatile siloxane.

102. (new) The method of claim 85 wherein the organic compound monomer is selected from the group consisting of N-vinyl pyrrolidone, allyl alcohol, acrylic acid, octa-1,7-diene, allyl amine, perfluorohexane, tetraethyleneglycol monoallyl ether and hexamethyl disiloxane.

103. (new) The method of claim 85 wherein the plasma polymer deposit was produced from a single organic compound monomer.

104. (new) The method of claim 101 wherein the organic compound monomer consists essentially of an ethylenically unsaturated organic compound.

105. (new) The method of claim 102 wherein the organic compound monomer consists essentially of a single ethylenically unsaturated organic compound.

106. (new) The method of claim 103 wherein the organic compound monomer consists of tetraethyleneglycol monoallyl ether.

107. (new) The method of claim 102 wherein the organic compound monomer consists of a mixture of two or more ethylenically unsaturated organic compounds.

108. (new) The method of claim 102 wherein the organic compound monomer is selected from the group consisting of an alkene containing up to 20 carbon atoms, a carboxylic acid, an alcohol and an amine.

109. (new) The method of claim 85 wherein the plasma polymer deposit is a co-polymer produced from at least two organic compounds.

110. (new) The method of claim 107 wherein the co-polymer comprises at least one organic compound monomer with at least one hydrocarbon.

111. (new) The method of claim 85 wherein the organic compound monomer is polymerisable and has a vapour pressure of at least  $6.6 \times 10^{-2}$  mbar.

112. (new) The method of claim 85 wherein the plasma polymer deposit is deposited on said surface in spatially separated dots.

113. (new) The method of claim 85 wherein the plasma polymer deposit is deposited on said surface in tracks or lines.

114. (new) The method of claim 85 wherein the chemical composition of the plasma polymer deposit is heterogenous along its length.

115. (new) The method of claim 85 wherein chemical composition of the plasma polymer deposit is heterogenous in its height.

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116. (new) The method of Claim 114 wherein the plasma polymer deposit is deposited on said surface in spatially separated dots.

117. (new) The method of Claim 115 wherein the plasma polymer deposit is deposited on said surface in spatially separated dots.

118. (new) The method of Claim 114 wherein the plasma polymer deposit is deposited on said surface in tracks or lines.

119. (new) The method of Claim 115 wherein the plasma polymer deposit is deposited on said surface in tracks or lines.

120. (new) The method of claim 85 wherein the surface further comprises non-plasma polymer deposited regions that are comprised of polymerized tetraethyleneglycol monoallyl ether.

121. (new) The method of claim 85 wherein the substrate is selected from the group consisting of glass, plastics, nitrocellulose, polyvinylidene fluoride, polycarbonate, polymethylmethacrylate, nylon, metal, ceramics, quartz, composite structures and silicon wafer.

122. (new) The method of claim 121 wherein the substrate is a plastic selected from the group consisting of polyethylene terephthalate, high density polyethylene, low density polyethylene, polyvinyl chloride, polypropylene and polystyrene.